Facility Name: **Albany Green Energy, LLC**
City: Albany
County: Dougherty
AIRS #: 04-13-09500109 Application #: 428316

Date SIP Application Received: June 24, 2020
Date Title V Application Received: June 24, 2020
Permit No: 4911-095-0109-V-02-1

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Introduction

This narrative is being provided to assist the reader in understanding the content of the referenced SIP permit to construct and draft operating permit amendment. Complex issues and unusual items are explained in simpler terms and/or greater detail than is sometimes possible in the actual permit. This permit is being issued pursuant to: (1) Sections 391-3-1-.03(1) and 391-3-1-.03(10) of the Georgia Rules for Air Quality Control, (2) Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, and (3) Title V of the Clean Air Act Amendments of 1990. The following narrative is designed to accompany the draft permit and is presented in the same general order as the permit. This narrative is intended only as an adjunct for the reviewer and has no legal standing. Any revisions made to the permit in response to comments received during the public comment period and EPA review process will be described in an addendum to this narrative.

I. Facility Description

A. Existing Permits

Table 1 below lists the current Title V permit, and all administrative amendments, minor and significant modifications to that permit, and 502(b)(10) attachments.

Table 1: Current Title V Permit and Amendments

Permit/Amendment Number	Date of Issuance	Description
4911-095-0109-V-02-0	November 8, 2019	Title V renewal permit

B. Regulatory Status

1. PSD/NSR/RACT

Albany Green Energy, LLC (AGE) is a major source with regards to the prevention of significant deterioration of air quality (PSD) regulation. AGE's potential to emit (PTE) CO, NO_x, and PM exceed the major source threshold of 100 tons per year (ton/yr). Note that Boiler B004 emission unit in the AGE facility is one of the 28 named categories [fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour (MMBtu/hr) heat input] whose major source threshold is 100 ton/yr.

Below are conditions whose purpose was to avoid PSD regulations or conditions that addressed PSD regulations:

3.2.1 The Permittee shall not cause, let, suffer, permit or allow the emission of sulfur dioxide (SO_2) from the Biomass Cogeneration Boiler (Source Code: B004) in amounts equal to or exceeding 58 tons during any 12-consecutive month period.
[Avoidance of 40 CFR 52.21(j)]

<u>BACT Limits for the Biomass Boiler (B004)</u>

3.3.1 The Permittee shall not cause, let, suffer, permit or allow the emission of nitrogen oxides (NOx) from the Circulating Fluidized Bed Biomass Cogeneration Boiler (Source Code: B004) in amounts equal to or exceeding 0.075 pound per million Btu (lb/MMBtu) on a 30-day rolling average, excluding periods of startup, shutdown, and malfunction.
[40 CFR 52.21(j) and 391-3-1-.02(2)(d) subsumed]

3.3.2 The Permittee shall not cause, let, suffer, permit or allow the emission of particulate matter less than 10 micrometers in diameter (PM_{10}) and $PM_{2.5}$ from the Biomass Cogeneration Boiler (Source Code: B004) in amounts equal to or exceeding 0.0268 pound per million Btu (lb/MMBtu), excluding periods of startup, shutdown, and malfunction.
[40 CFR 52.21(j); 391-3-1-.02(2)(d) subsumed]

3.3.3 The Permittee shall not cause, let, suffer, permit or allow the emission of carbon monoxide (CO) from the Biomass Cogeneration Boiler (Source Code: B004) in amounts equal to or exceeding 0.10 pound per million Btu (lb/MMBtu) on a 30-day rolling average, excluding periods of startup, shutdown, and malfunction.
[40 CFR 52.21(j)]

3.3.4 The Permittee shall not cause, let, suffer, permit or allow the emission of volatile organic compounds (VOC) from the Biomass Cogeneration Boiler (Source Code: B004) in amounts equal to or exceeding 0.007 pound per million Btu (lb/MMBtu), excluding periods of startup, shutdown, and malfunction.
[40 CFR 52.21(j)]

3.3.5 The Permittee shall not cause, let, suffer, permit or allow the emission of Greenhouse Gases (GHG expressed as CO_2e) from the Biomass Cogeneration Boiler (Source Code: B004) in amounts equal to or exceeding 906,290 tons per consecutive 12-month period.
[40 CFR 52.21(j)]

3.3.6 The Permittee shall not cause, let, suffer, permit or allow the emission of particulate matter less than 10 micrometers in diameter (PM_{10}) and $PM_{2.5}$ from the Sorbent Storage Silo (Source Code: SS1), the Fly Ash Storage Silo (Source Code: FAS1), and Biomass Silos #1 and #2 (Source Code: BMS1 and BMS2) in amounts equal to or exceeding 0.005 grain per dry standard cubic feet (gr/dscf).
[40 CFR 52.21(j)]

3.3.7 The Permittee shall install and continuously operate and maintain a drift eliminator on the cooling tower (Source Code: CT-1) designed to limit circulating water flow drift loss to 0.0005 % percent or less.
[40 CFR 52.21(j)]

BACT Compliance Method

3.3.8 To comply with Condition 3.3.1, the Permittee shall operate a Selective Non-Catalytic Reduction System (Control Device ID: SNCR-1) at the stack of the Biomass Cogeneration Boiler (Source Code: B004). The Permittee shall operate Control Device SNCR-1 at all times the Biomass Cogeneration Boiler (Source Code: B004) is operating except during periods of startup, shutdown, and malfunction; the SNCR will be operated as soon as practicable but no later than 7 hours after commencement of combustion of any fuel within the boiler. Nitrogen oxides emissions must begin being included in averaging periods established under this permit upon startup of the SNCR system
[40 CFR 52.21(j)]

3.3.9 To comply with Conditions 3.3.2 and 3.3.13, the Permittee shall operate a Baghouse (Control Device ID No. BH-1) at the stack of the Biomass Cogeneration Boiler (Source Code: B004). The Permittee shall operate Control Device BH-1 at all times the Biomass Cogeneration Boiler (Source Code: B004) is operating except during periods of startup, shutdown, and malfunction; the BH-1 will be operated as soon as practicable but no later than 6 hours after commencement of combustion of any fuel in the boiler.
[40 CFR 52.21(j)]

3.3.10 To comply with Condition 3.3.6, the Permittee shall operate the following on each silo: [40 CFR 52.21(j)]

a. Sorbent Storage Silo (Source Code: SS1) - Bin Vent Fabric Filter (Control Device ID No. VF-2),

b. Fly Ash Storage Silo (Source Code: FAS1) – Bin Vent Fabric Filter (Control Device ID No. VF-1),

c. Biomass Silo #1 (Source Code: BMS1) – Bin Vent Fabric Filter (Control Device ID No. BMV1),

d. Biomass Silo #2 (Source Code: BMS2) – Bin Vent Fabric Filter (Control Device ID No. BMV2).

The Permittee shall operate control equipment listed in a. through d. of this condition, including startup, shutdown, and malfunction.

3.3.11 To comply with Condition 3.3.7, the Permittee shall operate drift eliminators on the cooling tower (Source Code: CT-1). The Permittee shall operate the drift eliminators at all times Source CT-1 is operating, including startup, shutdown, and malfunction. [40 CFR 52.21(j)]

2. Title V Major Source Status by Pollutant

Table 2: Title V Major Source Status

Pollutant	Is the Pollutant Emitted?	If emitted, what is the facility's Title V status for the Pollutant?		
		Major Source Status	Major Source Requesting SM Status	Non-Major Source Status
PM	Yes	✓		
PM_{10}	Yes	✓		
$PM_{2.5}$	Yes	✓		
SO_2	Yes			✓
VOC	Yes			✓
NO_x	Yes	✓		
CO	Yes	✓		
TRS	Yes	✓		
H_2S	Yes	✓		
Individual HAP	Yes	✓		
Total HAPs	Yes	✓		

II. Proposed Modification

A. Description of Modification

AGE has submitted this application to address the following issues:

- Include the Bottom Ash System as an emissions source.
- Modify the facility's process description.
- Modify Condition 4.2.8 of the permit specifying the boiler tune-up frequency based on the presence of a Continuous Oxygen Trim System on Boiler B004.
- Correct the wording of Condition 6.1.7c.iii.
- Change the "Parent/Holding Company" name on the Cover Page from Exelon Corporation to Albany Green Energy, LLC.

B. Emissions Change

Table 3: Emissions Change Due to Modification

Pollutant	Is the Pollutant Emitted?	Net Actual Emissions Increase (Decrease) (tpy)	Net Potential Emissions Increase (Decrease) (tpy)
PM	Yes	0.0629	0.0846
PM_{10}	Yes	0.0297	0.0995
$PM_{2.5}$			
SO_2			
VOC			
NO_x			
CO			
TRS			
H_2S			
Individual HAP			
Total HAPs			

C. PSD/NSR Applicability

The modification is not subject to PSD. The changes sought are not a modification under NSPS or NESHAP.

IV. Regulated Equipment Requirements

A. Brief Process Description

AGE is a circulating fluidized bed biomass cogeneration boiler (Source Code: B004) with a maximum heat input capacity of 1,037 million British thermal units per hour (MMBtu/hr) burning biomass.

B. Equipment List for the Process

The biomass cogeneration boiler (Source Code: B004) is primarily fired on biomass but can combust up to 350 MMBtu/hr of natural gas. Half of the steam generated by the boiler is used to generate power for the electrical grid. The other half is supplied to the co-located Proctor and Gamble facility to support existing operations. The facility operates pursuant to Permit No. 4911-095-0109-V-02-0 issued on November 8, 2019. The pollutants emitted include all the products of combustion, that is, particulate matter, carbon monoxide, volatile organic compounds, nitrogen oxides, sulfur dioxide, and green-house gases.

Emission Units		Applicable Requirements/Standards	Air Pollution Control Devices	
ID No.	Description		ID No.	Description
B004	Circulating Fluidized Bed Biomass Cogeneration Boiler – 1,037 MMBtu/hr	40 CFR 52.21 391-3-1-.02(2)(d) 391-3-1-.02(2)(g) 40 CFR 60, Subpart Da 40 CFR 63, Subpart DDDDD	BH-1 SNCR-1 SI-1 ACI-1	Baghouse Selective Non-Catalytic Reduction Sorbent Injection Activated Carbon Injection

C. Equipment & Rule Applicability

AGE now operates the circulating fluidized bed biomass cogeneration boiler (Source Code: B004) located in Albany. However, this boiler which was permitted on November 19, 2013 via Permit Amendment No. 2676-095-0071-V-03-1 pursuant to the Prevention of Significant Deterioration of Air Quality (PSD) regulation belonged to Proctor & Gamble (P & G). AGE acquired the boiler from P & G on July 16, 2014 via Permit No. 4911-095-0109-V-01-0.

Bottom Ash System Description

During the initial permitting of the Facility in June 2013, the bottom ash handling operations were described as follows:

"Bottom ash is thoroughly wetted as it is drawn from the Biomass Cogeneration Boiler and conveyed to a storage bin with no emissions. Bottom ash is conveyed by pugmill into open trucks that remove the ash from site for disposal. There are no dust emissions from the minor drop from the pugmill into the truck due to water sprays, residual moisture content of the ash, and its propensity to remain clumped (again due to the moisture)."

Based on the above description, the Bottom Ash System was not expected to have emissions, as the entire system would be a closed system, except for the drops from the pugmill to the truck. However, the Bottom Ash System installed at the Facility differs from the above design description, resulting in a source of particulate matter (PM) emissions that was not initially accounted for or permitted. Specifically, the Bottom Ash System installed at the Facility utilizes a water-cooled screw conveyor to transfer coarse material from the boiler to a water-cooled drag chain conveyor. The coarse material is

then separated through a sieve, where the correctly sized material is pneumatically conveyed back to the boiler and the rest is sent to two bottom ash containers using a twin-screw conveyor.

The Facility currently utilizes two different types of bottom ash containers for collecting bottom ash – closed-top and open-top. When using the closed-top bottom ash containers, the Bottom Ash System is essentially a closed system resulting in minimal PM emissions during loading. However, due to the generation of more bottom ash than originally anticipated, the Facility also uses an open-top bottom ash container. The open-top bottom ash container is a source of fugitive PM emissions. Because the Bottom Ash System was constructed differently than what was originally permitted in the June 2013 Prevention of Significant Deterioration (PSD) application for the new boiler and ash handling system, the Facility is required to address BACT and the potential impacts of the Bottom Ash System on the original air quality impacts analysis.

The circulating fluidized bed biomass cogeneration boiler (Source Code: B004) is subject to the following regulations in part or in whole:

40 CFR 52.21 – "Prevention of Significant Deterioration of Air Quality"
40 CFR 60, Subpart Da – "Standards of Performance for Electric Utility Steam Generating Units"
40 CFR 63, Subpart DDDDD – "National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters"

Georgia Rule 391-3-1-.02(2)(d) – "Fuel-Burning Equipment"
Georgia Rule 391-3-1-.02(2)(g) – "Sulfur Dioxide"
Georgia Rule 391-3-1-.02(2)(e) – "Particulate Emission from Manufacturing Processes"
Georgia Rule 391-3-1-.02(2)(n) – "Fugitive Dust"

BACT Fugitive PM - Boiler (Source Code: B004)

Step 1: Identify all Control Technologies

The currently available Fugitive PM controls include Electrostatic Precipitator, Baghouse/Fabric Filter, Closed Ash Handling System, and Best Management Practices.

Electrostatic Precipitator

Electrostatic Precipitators (ESPs) are a control technology to reduce point sources of PM emissions. The ESP consists of four components: gas distribution plates, discharge electrodes, collection surfaces, and rappers. The discharge electrodes pass a positive or negative charge to the particles in the gas stream and are attracted to the oppositely charged collection surface. Rappers are used to remove the particles from the collection surfaces by vibration or mechanical impulses (dry ESPs) or by washing with water (wet ESPs).[1]

[1] Monitoring by Control Technique – Electrostatic Precipitators

Baghouse/Fabric Filter

Baghouses and fabric filters utilize fabric filtration to remove particles from a gas stream by capturing larger particles through the fabric. Over time, particles build up on the filter and allow the capturing of smaller particles. Baghouse filters can achieve upwards of 99% PM removal efficiency.[2]

Closed Ash Handling System

Closed ash handling systems consist of a closed loop ash containment system with a rain cover. Typical design of a closed ash handling system includes a guided closed pipe that is directly connected to a container. This control technology allows for the ash to fall directly into the container with practically zero fugitive emissions. AGE's current bottom ash handling system operates similar to the closed ash system described above. However, AGE's system uses both closed top containers and open top containers for collecting bottom ash.

Best Management Practices

Best management practices include proper operating techniques to reduce the possibility of fugitive emissions. These operating techniques may include the installation and operation of curtains around the ash load out system to prevent fugitive dust, proper boiler operation for ash production, and/or scheduled containment volume checks to prevent ash overflow.

Option 1: Baghouse/Fabric Filter Option 2: Electrostatic Precipitator Option 3: Closed Ash Handling System Option 4: Best Management Practices

Step 2: Eliminate Technically Infeasible Options

Baghouses/Fabric Filters, and ESPs are not considered to be technically feasible control technologies because the Bottom Ash System is a fugitive source of emissions. ESPs, Baghouses, and Fabric Filters are used to control point sources of emissions with consistent gas stream characteristics. Because the Bottom Ash System is not a point source of emissions, an ESP, Baghouse, or Fabric Filter would not be effective for controlling PM emissions.

Step 3: Ranking Remaining Control Technologies by Control Effectiveness

Closed Ash Handling System ranks highest since there is minimal PM emissions. Best Management Practices ranks second best with a potential to emit PM of 0.0846 ton per year.

Control Technology Ranking	Control Technology	Control Efficiency
1	Closed Ash Handling System	100
2	Best Management Practices/ Open Ash Handling System	0

n/a not applicable

[2] Monitoring by Control Technique – Electrostatic Precipitators
https://www.epa.gov/air-emissions-monitoring-knowledge-base/monitoring-control-technique-electrostatic-precipitators

Step 4: Evaluate Economic, Environmental, and Energy Impacts of Technically Feasible Control Technologies

The most effective control is the Closed Ash Handling System with the closed-top bin because there are minimal fugitive PM emissions during loading of the bin into trucks for offsite disposal. One bin is already equipped with this system. The facility was originally designed and permitted for one closed-top bin. But one bin was inadequate and could not handle all the bottom ash produced by the boiler. Therefore, a second open-top bin was installed. The open-top bin is covered after being filled to minimize fugitive PM emissions.

The total annual cost for the use of closed-top bins has been estimated by AGE to be $417,682 compared to a cost of $183,684 for open-top bins for the disposal of 0.0846 ton/yr bottom ash, for a cost effectiveness of $2,765,934 per ton of fugitive PM removed. This is well above the acceptable cost effectiveness for PM removal.

Step 5: Select BACT

BACT is best management practices/open ash handling system with the open-top bin for the bottom ash removal.

Conclusion – Fugitive PM Control

The EPD has determined that AGE's proposal to use best management practices/open ash handling system with open-top bin constitutes BACT. The BACT emission limit has been established as 0.0846 ton/yr as proposed by AGE.

Summary – Control Technology Review for Fugitive PM Bottom Ash Handling System

To fulfill the PSD permitting requirements for PM, AGE conducted a BACT analysis for the Bottom Ash System. The BACT selection for the Bottom Ash System is summarized in the table below.

Pollutant	Control Technology	Proposed BACT Limit	Averaging Time	Compliance Determination Method
Fugitive PM	Best Management Practices/Open Ash Handling System	0.0846 ton/yr ≈ 0.10 ton/yr	Consecutive 12-month period	N/A

Ambient Air Quality Review

A $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) Significant Impact Level (SIL) Analysis was previously included in the June 2013 PSD application. The results of the analysis found the modeled concentration did not exceed the SIL. The Bottom Ash System is only expected to release up to 0.0193 lb/hr of fugitive PM based on worst-case PTE emissions rates. In addition, the Bottom Ash System is located near the center of the Facility and the height of the fugitive release point of the ash to the containment system is approximately 5 feet. Based on the maximum PTE emissions rate of fugitive PM from the Bottom Ash System, the location of the Bottom Ash System in comparison to the Facility's fence line (465 feet), and the height of the fugitive emissions release point, fugitive PM emissions are

not expected to disperse beyond the fence line of the Facility. As such, inclusion of the Bottom Ash System is not expected to impact the results of the SIL analysis completed during the June 2013 PSD analysis for the Facility.

This Facility is located within 300 km of multiple Class I areas. This designation allows for stricter air quality standards within the National Ambient Air Quality Standards (NAAQS) when completing a PSD analysis. The June 2013 PSD analysis included a discussion of Class I impacts and determined that additional analysis was not required because the ratio of emissions to Class I distance (Q/d) was less than 10. The inclusion of the Bottom Ash System would not have impacted these conclusions due to the small PTE emissions rate of 0.0846 ton/yr. Therefore, no further Class I evaluation is required.

D. Permit Conditions

Condition No.	Description
3.2.2	New Condition. Pursuant to 40 CFR 52.21, this condition requires the Permittee to limit fugitive particulate matter emission from the Bottom Ash Disposal System not to exceed 0.10 ton during any consecutive 12-month period.

V. Testing Requirements (with Associated Record Keeping and Reporting)

Condition No.	Description
4.2.8	Modified Condition, V-02-0. Pursuant to 40 CFR 63.7515(d) and 40 CFR 63.7540(a)(12), this condition requires the Permittee to conduct a performance tune-up of the boiler (Source Code B004) every five years, not to exceed 61 months from the previous tune-up. This change became necessary following notification that the boiler is equipped with a continuous oxygen trim system that maintains an optimum air to fuel ratio.

VII. Other Record Keeping and Reporting Requirements

Condition No.	Description
6.1.7.c.iii.	Modified Condition, V-02-0. Pursuant to Georgia Rule 391-3-1-.02(6)(b)1, this condition requires the Permittee to report as an excursion any monthly inspection of a vent filter as required by Condition 5.2.4 that reveals a problem that is not resolved in accordance with the Preventive Maintenance Program. This was necessary to rectify the incorrect inspection frequency.
6.2.9	Modified Condition, V-02-0. Pursuant to 40 CFR 63.7510(g), this condition requires the Permittee to conduct the 5-year tune-up as specified in 40 CFR 63.7540(a). This is necessary because the boiler performance tune-up frequency has changed from annual to every 5 years following notification that the boiler is equipped with a continuous oxygen trim system.

Condition No.	Description
6.2.18	New Condition. Pursuant to Georgia Rule 391-3-1-.02(6)(b)1 and 40 CFR 52.21(j), this condition requires the Permittee to maintain a monthly and a consecutive 12-month period record of the ton of fugitive particulate matter emission from the Bottom Ash Disposal System. This is necessary to confirm compliance with Condition 3.2.2.

Addendum to Narrative

The 45-day EPA review started on month day, year and ended on month day, year. Comments were/were not received by the Division.

//If comments were received, state the commenter, the date the comments were received in the above paragraph. All explanations of any changes should be addressed below.//